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REPORT OF THE SIGNAL CORPS OBSERVER,  
OPERATION "HIGHJUMP"



Submitted by:

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Coles Signal Laboratory  
Red Bank, New Jersey

**SIGNAL CORPS ENGINEERING LABORATORIES**  
**BRADLEY BEACH N.J.**

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REPORT OF THE SIGNAL CORPS OBSERVER, OPERATION "HIGHJUMP"

1 DECEMBER 1946 to 1 APRIL 1947

Submitted by

Amory H. Waite, Jr., Radio Engineer  
Coles Signal Laboratory, United States Army Signal Corps  
Red Bank, New Jersey

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APPENDIX A - Copy of Mutual Plan of Action for Combined War  
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- ERRATA -
1. Page 24, change "were such", second line, third paragraph to read "was such".
  2. Page 42, change "but noisy devices", last line, paragraph g. to read "but electrically noise devices".
  3. Page 47, put in period after "whose specialty it was", paragraph f.
  4. Change Roman Numeral "VII", page 53, to "V".
  5. Change Roman Numeral "VIII", page 59, to "VI".
  6. Change "growlets", last paragraph, page 19, to "growlers".
  7. Change top line, page 30, to read "3 Aviation Electrician's Mates" instead of "3 Electronician's Mates".



known as the Eastern, Central, and Western Groups, comprising three or more ships and several hundred men each, supported by two tankers, the submarine USS Sennett, and the aircraft carrier USS Philippine Sea, would explore as much territory adjacent to, and as far East and West of Admiral Byrd's old camp of Little America as the natural conditions encountered would permit. Ships and planes would be the primary means of travel.

The Central Group would establish a base and construct an airfield near the Bay of Whales to which heavy aircraft (six R4D's) could be flown from the carrier outside the 600 mile wide pack ice, and from which safe takeoffs for exploratory flights could be made. This base would also provide facilities for the study of many other phases of cold weather living and operation.

The Eastern and Western Groups would operate entirely from vessels, using amphibian and helicopter aircraft.

B. The purposes of Operation Highjump as set forth in Navy directives are quoted as follows:

1. "Training personnel and testing equipment in frigid zones."
2. "Consolidation and extending United States sovereignty over the largest practical area of the Antarctic continent."
3. "Determining the feasibility of establishing, maintaining and utilizing bases in the Antarctic continent and investigating possible base sites."
4. "Developing technique for establishing, maintaining and utilizing air bases on the ice, with particular attention to later applicability of such technique to operations in interior Greenland, where conditions are comparable to those of the Antarctic."
5. "Amplifying existing stores of knowledge of hydrographic, geographic, geological, meteorological and electro-magnetic propagation conditions in the area."

"Note: The operation is to be relatively short in duration and will take place during the summer months only. Hence, it will not be possible to study seasonal changes in environment, nor the extreme weather and other conditions characteristic of this area throughout the year. Technical control of Operation Highjump will be with C.N.O., exercised by Rear Admiral Richard E. BYRD, USN, (Ret.) who is officer in charge of the project. The actual expedition comprises a task force of the U.S. Atlantic Fleet, under command of Rear Admiral Richard H. CRUZEN, USN."

C. Preparatory plans were completed and loading of the vessels was begun by October and in mid-November six Army representatives were invited to participate. This group, headed by Dr. Paul A. Siple, WD General Staff, was extended to fourteen and the following persons reported aboard Rear Admiral R. H. Cruzen's Flagship, the USS Mount Olympus, at Norfolk, Virginia

on 1 December 1946:

Lt. Col. Robert C. Love, Aero-medical  
Lt. Col. Willis S. Johns, AACCS  
Lt. Col. John H. Davis, Airborne Infantry  
Major Dan Crozier, MC  
Major James H. Holcombe, Corps of Engineers  
Captain Charles H. Harrison, Air Weather Service  
Captain Murray A. Wiener, Search and Rescue  
1st Sgt. S. A. London, Search and Rescue  
Pvt. John Shimberg, SC Photographer  
Pvt. J. Waltersdorf, SC Photographer  
Mr. A. H. Waite, Jr., Engineering and Technical Service, OCSigO.

Dr. Siple, Senior War Department Observer, joined the group at Panama and Chief Warrant Officer A. J. L. Morency, Transportation, and Mr. Robert Davis, WD General Staff, Radar Mapping Specialist, at Little America. One enlisted photographer assigned to the Eastern and one to the Western Group completed the roster of the WD personnel.

Observers and scientists from the USMC, the Geodetic Survey, the Geological Survey, Fish and Wildlife Service, NRL, NOL, the Hydrographic Office, the US Weather Bureau, and the US Naval Reserve also accompanied the expedition.

The USS Mount Olympus left Norfolk 2 December 1946.

D. Meetings of the War Department observers were held on alternate days during the voyage from Panama to the Antarctic and a definite observation plan was formulated. This is shown in outline form in Appendix A. The cross reference table was essential since many observers required information for their respective branches of the service which was also of interest to others. Each, therefore, gave priority to the subject he was most interested in, and provided required information on that subject to the rest.

E. A joint WD observers report has been prepared during the return journey following the above plan in such a way that the observer most interested in a given subject prepared its history. When the composite report is circulated, therefore, each service, i.e., Signal Corps, Medical Corps, etc., will receive information pertinent to its own pursuits plus valuable data from all others represented. In this report, the remarks of the writer supplement those of Lt. Col. Johns, AACCS, whose primary interests lay in the overall operational activities of the expedition observed from the viewpoint of the Airforce rather than in detailed equipment behavior.

## II. SUMMARY.

A. This report presents all observations of the writer relative to the use and operation of air, land and water-borne electronic equipment by Task Force 68 throughout the period 1 December 1946 to 1 April 1947

believed of interest to the Signal Corps. In its complete form this report will be circulated only to that service but certain portions have been included in the joint report described in E above. An official Navy Department report on Operation Highjump (to be published later) will include tables of measurements of propagation and Heaviside layer reflection data on all frequencies between 2 and 20 mcs from the United States to Antarctica, as well as an official report on Photography by the Task Force Photographic Officer. In this connection, the Signal Corps Enlisted Photographers assigned to the Central Group acted as photographic observers throughout the trip in addition to their other duties, and their excellent report will be found in the WD paper described in Par. I. D. above. See Photography Par. IV F.

B. Following the outline mutually agreed upon by all Army observers, Section III, Operations Plan, presents the communication section of the Operations Plan of Task Force 68 which establishes rules for ship-to-ship, ship-to-shore, ship-to-plane, and ground-to-plane operation, assigns frequencies and call letters and describes radar results to be expected.

C. Section IV, Observations, sets forth the writer's remarks pertinent to Naval performance in carrying out the directives of the Operations Plan, and can be summarized as follows:

1. The USS Mount Olympus, an Amphibious Command Ship, was expedition Net Control Station until departure from New Zealand for the return to the United States, and all traffic was relayed through it until that time. Standard Navy transmitters operating between 185 kc and 156 mc adequately covered all required distances with varying powers of from 20 to 5000 watts. Radar was used extensively.

2. An Airstrip Control Station constructed at Little America handled plane-to-ground (max. 800 miles), base-to-ship (2-700 miles), and base-to-base (2 miles) traffic throughout the period 23 January to 24 February 1947 without excessive difficulty.

3. An Emergency Base Station, built for possible year-long occupation in case of need, was equipped with higher power equipment and better antennas which included rhombics for overseas contacts. Successful contacts were made with Washington with 500 watts on 4, 6, 12, and 18 mcs during a two day test period, and a major part of ship-shore traffic was handled here throughout the stay on the ice (3-700 miles).

4. Electronic equipment in the six R4D aircraft was standard, required little maintenance and provided reliable air-ground communications to distances of 800 miles, the longest flight flown. New corona insulated antennas proved successful.

5. A Ground Control Approach unit taken to the Antarctic was not used but a GPN, installed on the Ross Shelf Ice at Little America IV, worked perfectly to its 30 mile limit. Plane and ship search radar operated normally and large icebergs were discovered at 40,000 yards. Small ones were seldom



installed with improved power and counterpoise systems whenever snow is more than a few feet thick above water or land to provide a 200 mile range.

7. Noise levels in standard communications receivers operated on high barrier ice or snow, where electrical grounding was impossible and counterpoises became pickup antennas suspended in space, were exceedingly high. Individual antenna-counterpoise systems for each transmitter and receiver are therefore recommended for similar operations in future. All transmitters, vehicles, power units, and particularly DC generators should be isolated as far as possible from receiving positions, and non-mobile noise generators should be equipped with filters for isolating noise voltages from radiating power lines and/or bonded to a central connection other than those used for propagation or reception. In addition, all battery charging near receiving installations should be accomplished with AC rectifiers instead of DC generators.

8. Two USMC LVT's equipped with SCR-508's for intercommunication, and one with a standard Navy TCS 25 watt 2-12 mc transmitter-receiver unit for tractor-to-base contacts comprised the only radio-equipped trail party to leave Little America. This travelled to a point 134 miles away and stayed out a week. The SCR-508's became inoperative after a few miles, but the TCS easily maintained schedules with a dipole antenna throughout the trip on 6430kc although voice contacts on 4125 kc using whip antennas petered out at about 25 miles. The SCR-694, carried as a spare, was found inoperative upon its return because of the excessive pounding it received on the cargo sled which carried it.

9. All equipment at Little America was operated in warmed tents or buildings except a few SCR-610's and SCR-536's and certain power units, and temperatures averaged above zero so little can be added to already available information on winterization. Lows of -6, -18, and -25 degrees F. were experienced for short periods.

10. The officers and men employed to operate shipboard equipment were drawn from each ships complement. Those for the moving ashore, installation, operation and maintenance of the shore stations and airborne equipment were part of the Staff. Two officers, two chief petty officers, and 28 electricians, technicians and radiomen comprised the shore detail, one half of which was schooled in aviation electronics.

D. Section V, Recommendations, details to the best of the writer's ability what the Signal Corps should do to get optimum results if and when confronted by the problems encountered by Task Force 68, in addition to those in C. above.

E. Section VI, Miscellaneous, sets forth miscellaneous items of information which may have little value to most readers, but which should not go unrecorded in Signal Corps files.

F. An Appendix and many officially and personally taken photographs are added to form the complete report.

### III. OPERATIONS PLAN.

The communications portion of the Commander of Task Force 68's Operation Plan #2-46, "HIGHJUMP", is included in its entirety to indicate the wide scope of the communications involved in an operation of this magnitude, and to serve as a potential model for similar actions in future. It was followed with but few changes and these were largely frequency variations dictated by unforeseen propagation conditions.

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